

(No Model.)

2 Sheets—Sheet 1.

A. SOTTIAUX.

APPARATUS FOR PULVERIZING AND SEPARATING COAL, &c.

No. 306,544.

Patented Oct. 14, 1884.

Fig. 2.

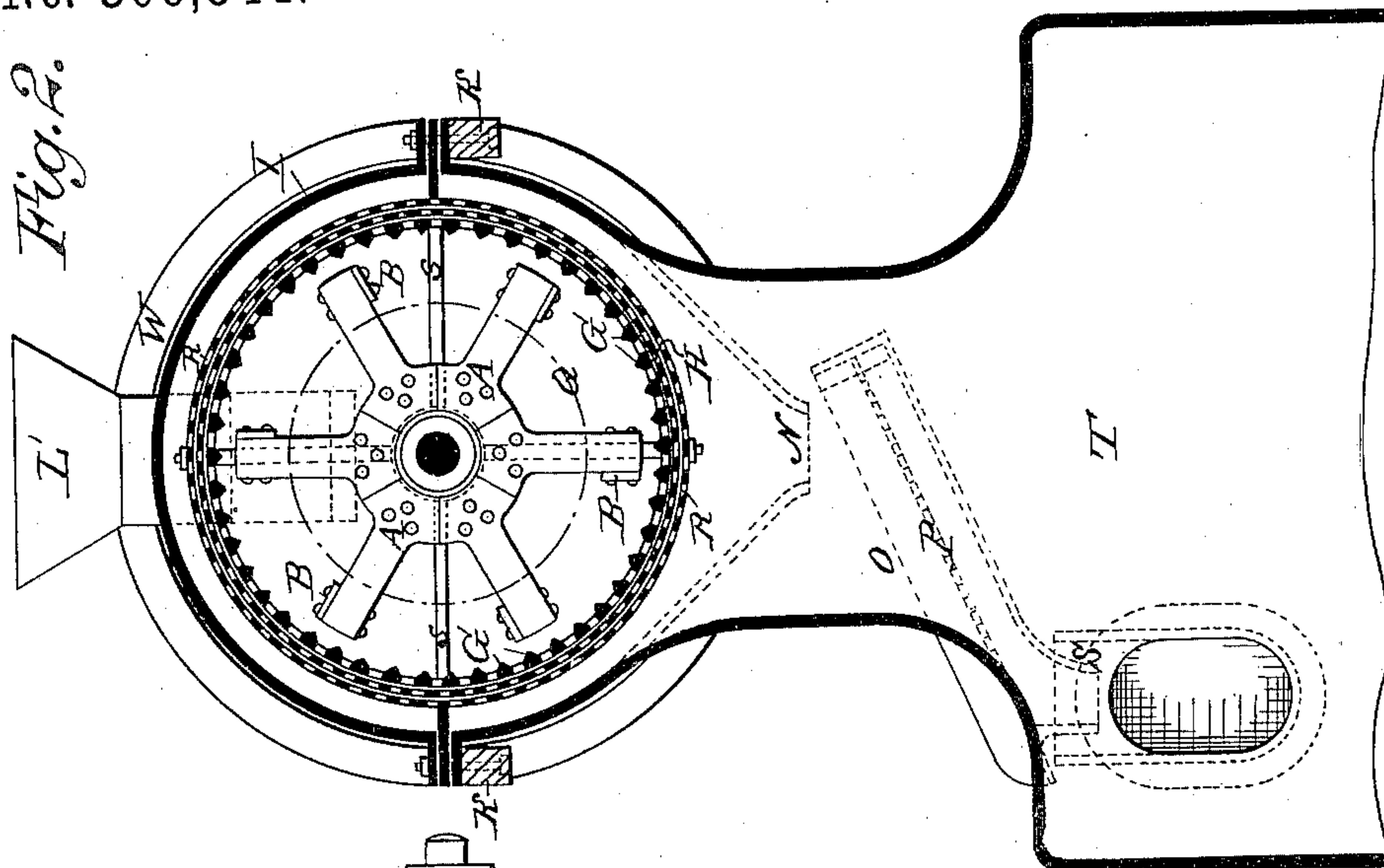
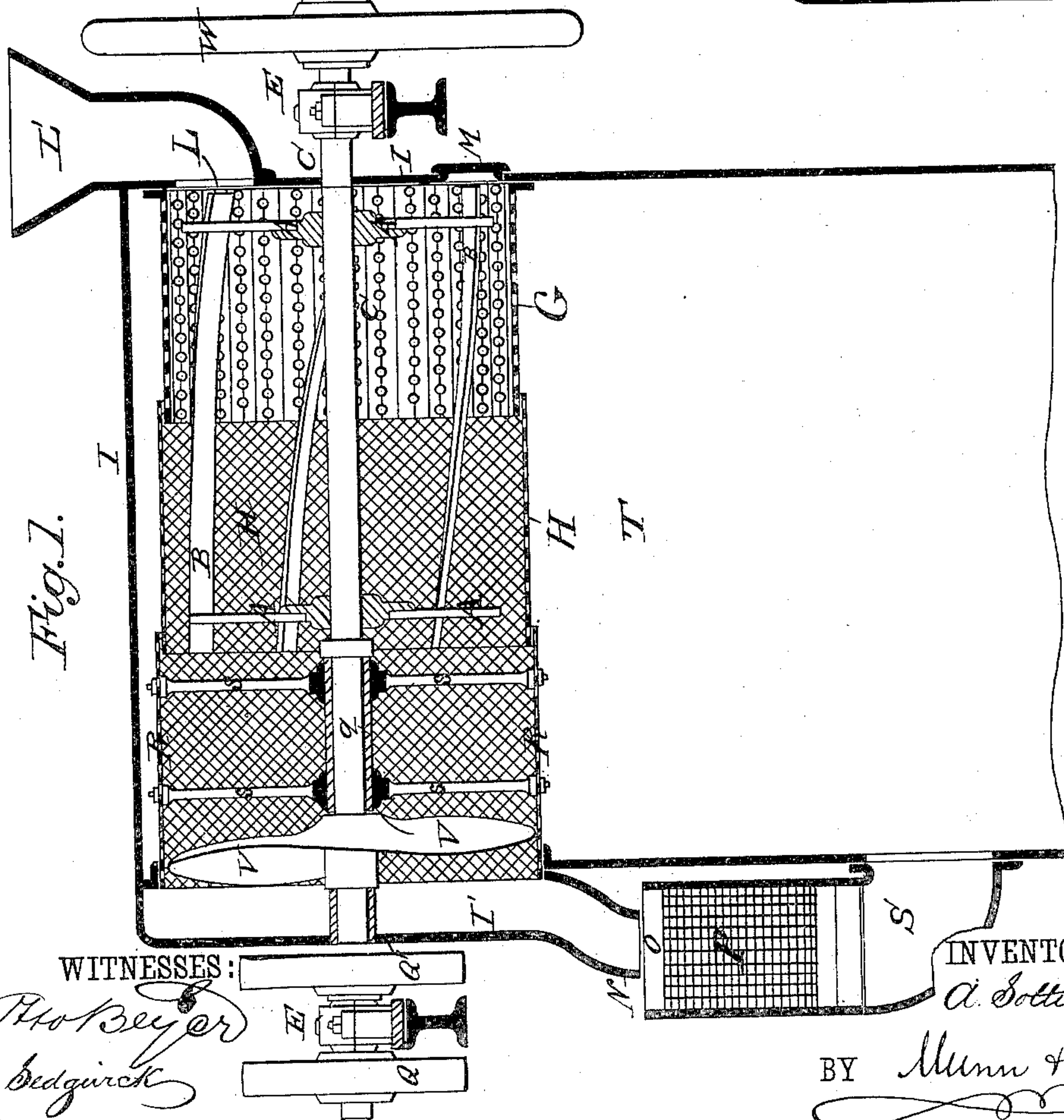


Fig. 1.



WITNESSES:

Photo Beyrer
C. Bedgwick

INVENTOR:

A. Sottiaux

BY

Munn & Co

ATTORNEYS.

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Fig. 3.

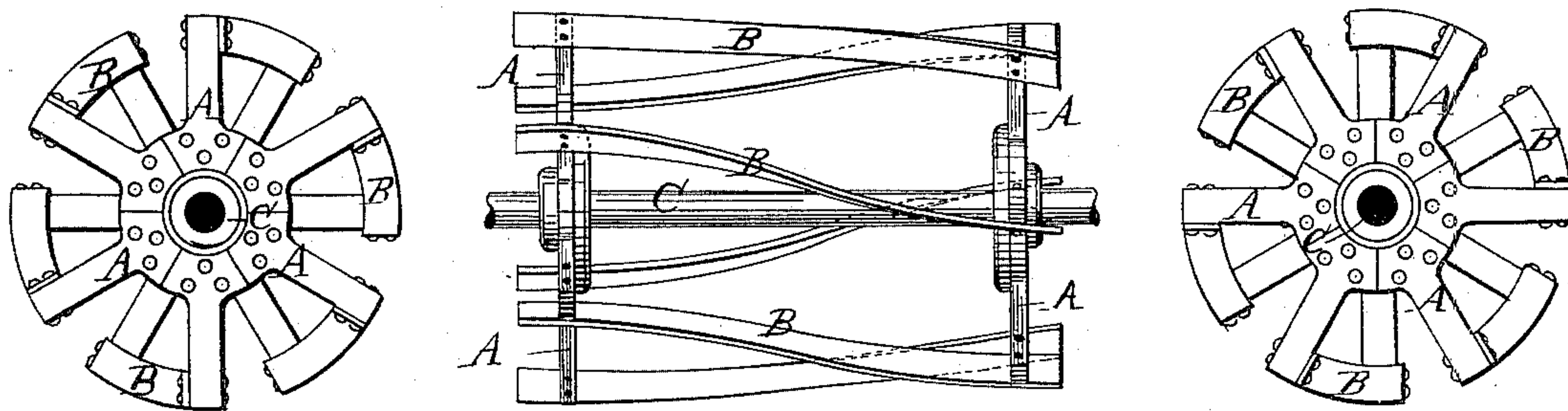


Fig. 4.

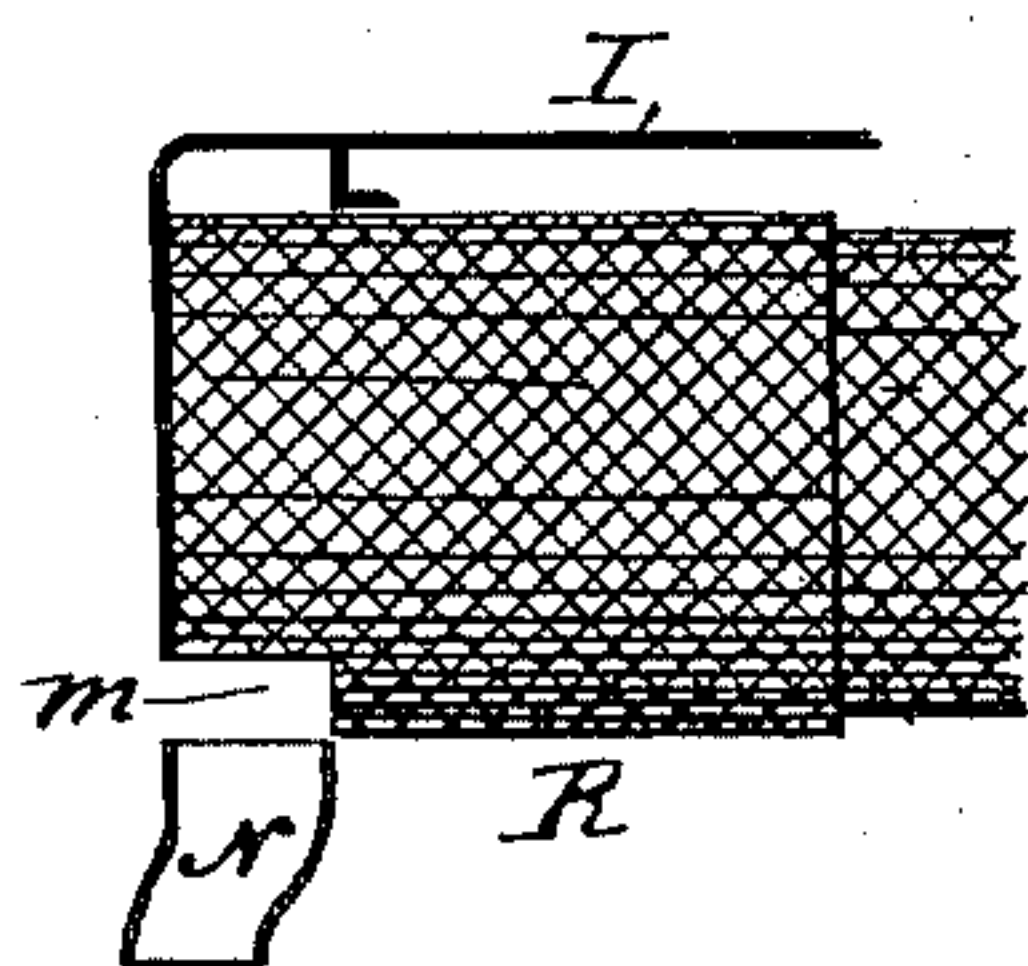
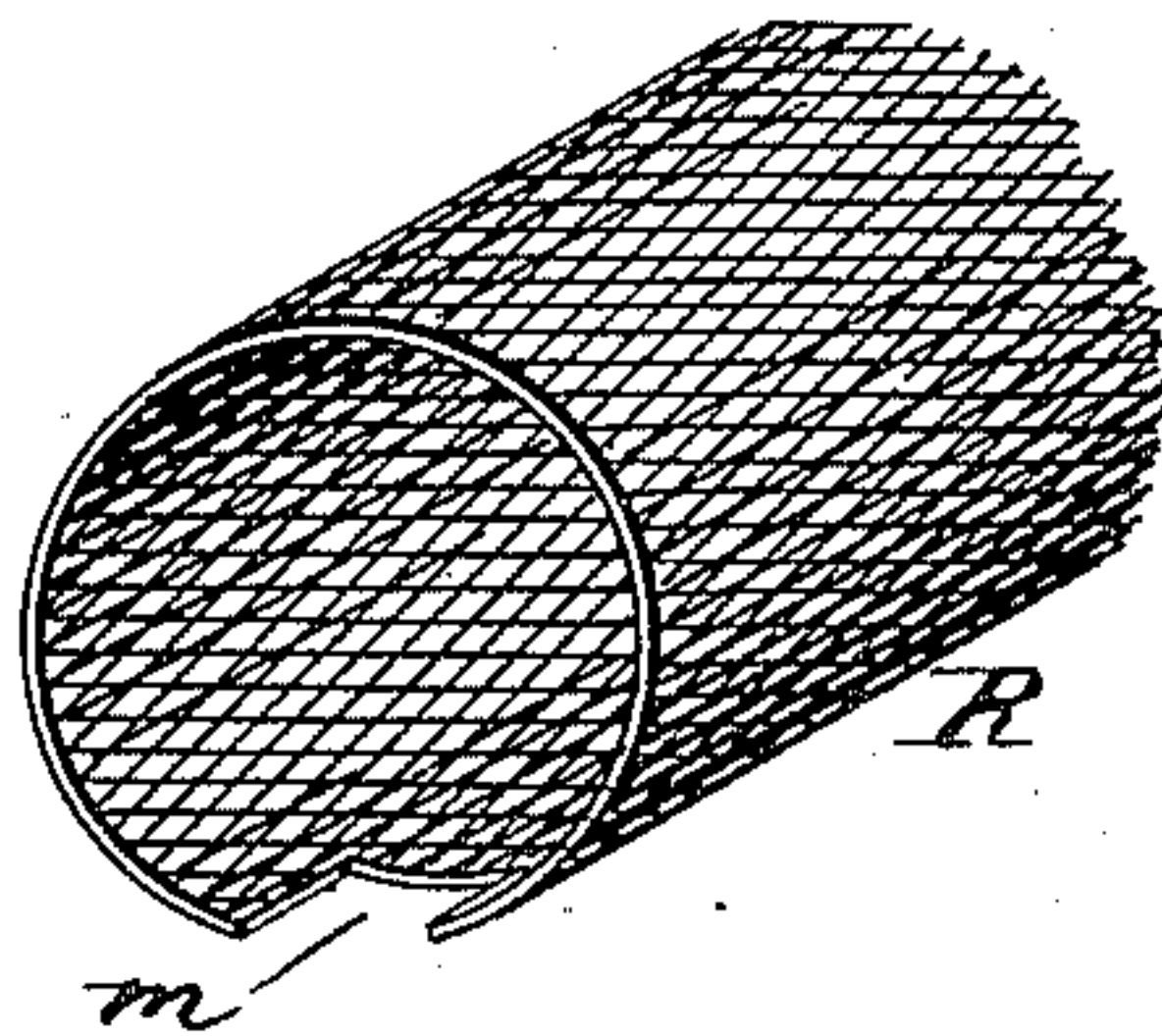


Fig. 5.



WITNESSES:

Do Beyer
L. Sedgwick

INVENTOR:

A. Sottiaux
BY *Munn & Co*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

AMOUR SOTTIAUX, OF STREPY-BRACQUEGNIES, BELGIUM.

APPARATUS FOR PULVERIZING AND SEPARATING COAL, &c.

SPECIFICATION forming part of Letters Patent No. 306,544, dated October 14, 1884.

Application filed August 27, 1884. (No model.) Patented in Belgium April 8, 1884, No. 64,767.

To all whom it may concern:

Be it known that I, AMOUR SOTTIAUX, of the city of Strepy-Bracquegnies, Belgium, have invented new and useful Improvements in Apparatus for Pulverizing and Separating Coal and other like Materials, of which the following a full, clear, and exact description.

This invention relates to machinery or apparatus for pulverizing and sifting or separating coal and other like materials, and it has for its object providing means for rapidly and effectually pulverizing the coal and expelling the dust from the apparatus as fast as it is produced, leaving intact, or in relatively large lumps, the foreign matter which it contains, thereby enabling the latter to be more readily separated from the valuable pulverized matter or dust; and in order that my said invention may be fully understood, I shall now proceed more particularly to describe the same, and for that purpose shall refer to the several figures in the annexed sheets of drawings, the same letters of reference indicating corresponding parts in all the figures.

Figure 1 of the accompanying drawings represents a longitudinal section of the apparatus; Fig. 2, a transverse section of the same; Fig. 3, a side and two end elevations of the breaker; and Figs. 4 and 5, drawn to a smaller scale, represent, respectively, a side elevation and a perspective view of a portion of the sifter, hereinafter described.

The apparatus consists, essentially, of a breaker provided with helical blades or pallets B, partaking of rapid rotary motion inside a stationary perforated cylinder or drum. This breaker is composed of two or more sets of radial arms, A, (there being six in each set in the example illustrated,) keyed upon a horizontal shaft, C, and having attached to their extremities, by rivets or otherwise, a corresponding number of flat bars or plates, B, of iron, the flat sides of which are laid against the radial arms. The arms are rigidly connected to the shaft in such a position that they do not coincide or lie in the same plane as the shaft, or coincide with the generating-line of the cylinder generated by their revolution, but are set at an angle to such line, so as to form portions of a helix coiled upon this cylinder.

In place of solid blades, perforated plates may be employed; but it is preferred to employ solid plates on account of the current of air which they create. The horizontal shaft C works in two bearings, E, fastened to two supports suitably arranged, and revolves with the breaker in the interior of a perforated or foraminous cylinder or drum composed of two parts, G and H. The part G at the feed end is made of cast-iron, grooved and presenting perforations at the bottoms of the grooves. The part H consists of a plain sheet of wiregauze or perforated sheet metal, suitably fixed and connected to the part G. A cylindrical sifter, R, is fitted over the extremity of the drum H and turns freely thereon, being rendered independent of the horizontal shaft C by a sleeve, q, mounted loosely upon the latter and carrying the radial arms s, supporting the drum or the cylindrical sifter R, which is provided at its rear end with a helical curved plate or blade, V. The cast-iron drum G is attached by means of a flange or otherwise to a plate forming the front end of a sheet-iron case, I, concentric with the perforated drums G, H, and R, and attached, in common with the said drums, to two lateral beams or supports, K. The case I, which incloses the whole apparatus, is open throughout its entire length on the underside, and communicates through this opening with a dust-box or compartment, T. Two openings, L and M, are formed in the front. The upper opening, L, communicates with the hopper L', through which the materials are supplied to the apparatus, and the lower opening, M, provided with a door, serves for cleaning out the drum. The rear end is provided at its lower part with a discharge-spout, N, overhanging an inclined sieve, P, arranged in a chute, O, and partaking of a vibratory or shaking motion. The space underneath the sieve P communicates through a passage, S, with the dust-box T, but the materials remaining on the upper side of the sieve are discharged into a separate compartment. In place of this sifting arrangement, a rotating cylindrical sifter or drum may be employed, the object of this part of the apparatus being simply to collect any valuable materials that may eventually accompany the

hard substances discharged through the spout N. Motion is imparted to the breaker by means of a pulley, Q, on the rear end of the horizontal shaft, and the motion is regulated by a fly-wheel, W, keyed upon the front extremity of the said shaft. In like manner rotary motion is imparted to the cylindrical sifter R by means of a pulley, Q', keyed upon the sleeve q.

The action of this apparatus is as follows: When the breaker is set in motion, the coal is introduced regularly through the feed-hopper and falls through the opening L into the space between the blades or beaters B of the breaker, which in their rapid movement of rotation strike and break up the pieces of coal and throw the fragments first against the sides of the cast-iron cylinder and subsequently against the wire-gauze. The current of air produced by the rotating blades or beaters assists the pulverized portion or dust in escaping by forcing it through the perforations in the cast-iron casing and in the wire-gauze, after which it falls through the opening in the bottom of the outer casing, I, into the dust box or receptacle T. This immediate removal of the pulverized matter by the pressure of the current of air enables this apparatus to act effectually upon large quantities of material in an extraordinarily short space of time. The effect may be still further increased by the employment of an auxiliary current of air introduced into the drums G H. The harder and less finely-divided materials are propelled by the helical blades B into the rotating cylindrical sifter R, which continues the sifting process; and, in order that they may not be projected directly into the space I', reserved between the rear end of the sifter and the end of the casing I, carrying with them a certain quantity of valuable matter, they are stopped by the helically-curved plate V, which prevents the materials from entering the space I' until after the rotary motion of the cylindrical sifter has brought them up to the opening in the said plate, by which time they are absolutely separated from all the valuable portion, which falls through the sieve into the main receptacle. The opening in the helical plate is formed between the ends of the said plate by the said ends being in different vertical planes.

The plate V may be provided with more than one opening, if required, in order to allow the slaty and like matter in lumps to escape at several points. According to another arrangement the plate or divided helix V may be dispensed with altogether, the sides of the cylindrical sifter R being prolonged so as to meet the end of the outer casing, I, as indicated in Fig. 4, and presenting one or more lateral openings, m, as shown in Figs. 4 and 5, for the discharge of the schistose or strong matter through the spout N, onto the sieve P, in the chute O. The dust alone passes through this

sieve, and is conducted through the passage S into the box or compartment provided for its reception, while the strong matter remaining on the sieve is delivered into a separate compartment. It should be observed, however, that when the cylindrical sifter R, with a divided helical plate at the end is employed, this arrangement is superfluous, the latter being rendered necessary only when the apparatus is worked without the sifting-cylinder R.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

1. In a breaking and separating apparatus, the combination, with a cylinder, G, having longitudinal ribs in its inner surface and apertures between the ribs, of the apertured cylinder H, and a revolving breaker in the said cylinders, substantially as herein shown and described.

2. In a breaking and separating apparatus, the combination, with the apertured cylinders G and H, of the cylindrical screen R, the shaft C, a breaker mounted rigidly on the same, and contained in the cylinders G H, and a sleeve mounted loosely on the shaft, and provided with arms carrying the cylindrical screen R, substantially as herein shown and described.

3. In a breaking and separating apparatus, the combination, with the apertured cylinders G and H, of the cylindrical screen R, the shaft C, a breaker mounted rigidly on the same and contained in the cylinders G H, a sleeve mounted loosely on the shaft, and provided with arms carrying the cylindrical screen R, and the helical plate V, held in the outer end of the cylindrical screen R, substantially as herein shown and described.

4. In a breaking and separating apparatus, the combination, with the apertured cylinders G H, the shaft C, and the cylindrical screen R, of a breaker mounted rigidly on the shaft within the apertured cylinders G H, the spout N, and the screen P, substantially as herein shown and described.

5. In a breaking and separating apparatus, the combination, with apertured cylinders, of a shaft passed longitudinally through them, a breaker mounted on the shaft, a cylindrical screen mounted loosely on the shaft and projecting over the outer end of the apertured cylinder, and a helical plate in the outer end of the screen, substantially as herein shown and described.

The foregoing specification of my improvements in apparatus for pulverizing and sifting or separating coal and other like material signed by me this 16th day of July, 1884.

AMOUR SOTTIAUX.

Witnesses:

AUG. FORISSEU,
EMILE HUYTS.